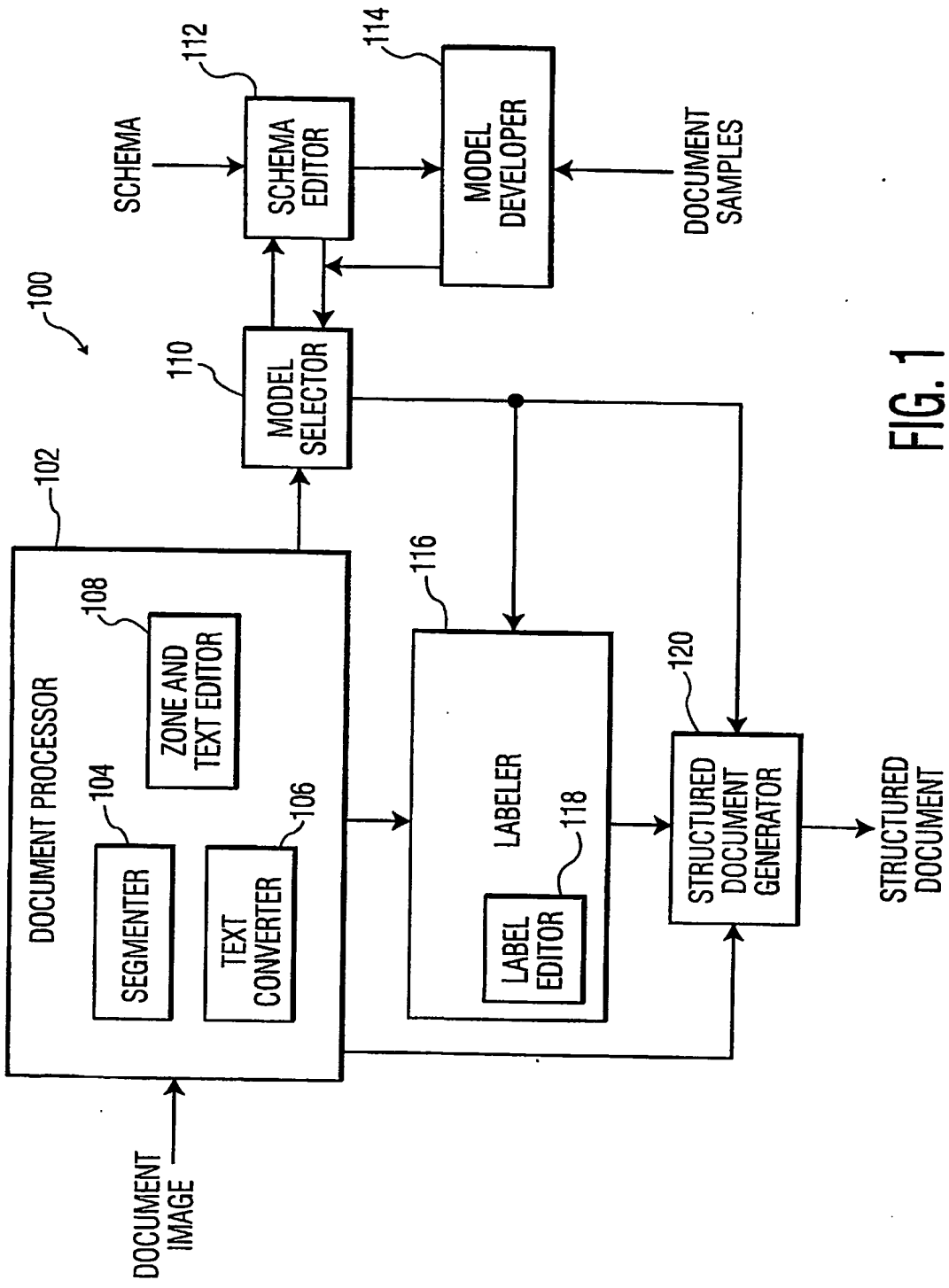

100
102
104
106
108
110
112
114
116
118
120
SCHEMA
SCHEMA EDITOR
MODEL DEVELOPER
DOCUMENT SAMPLES
MODEL SELECTOR
DOCUMENT PROCESSOR
ZONE AND TEXT EDITOR
SEGMENTER
TEXT CONVERTER
LABELER
LABEL EDITOR
STRUCTURED DOCUMENT GENERATOR
STRUCTURED DOCUMENT
DOCUMENT IMAGE

FIG. 1

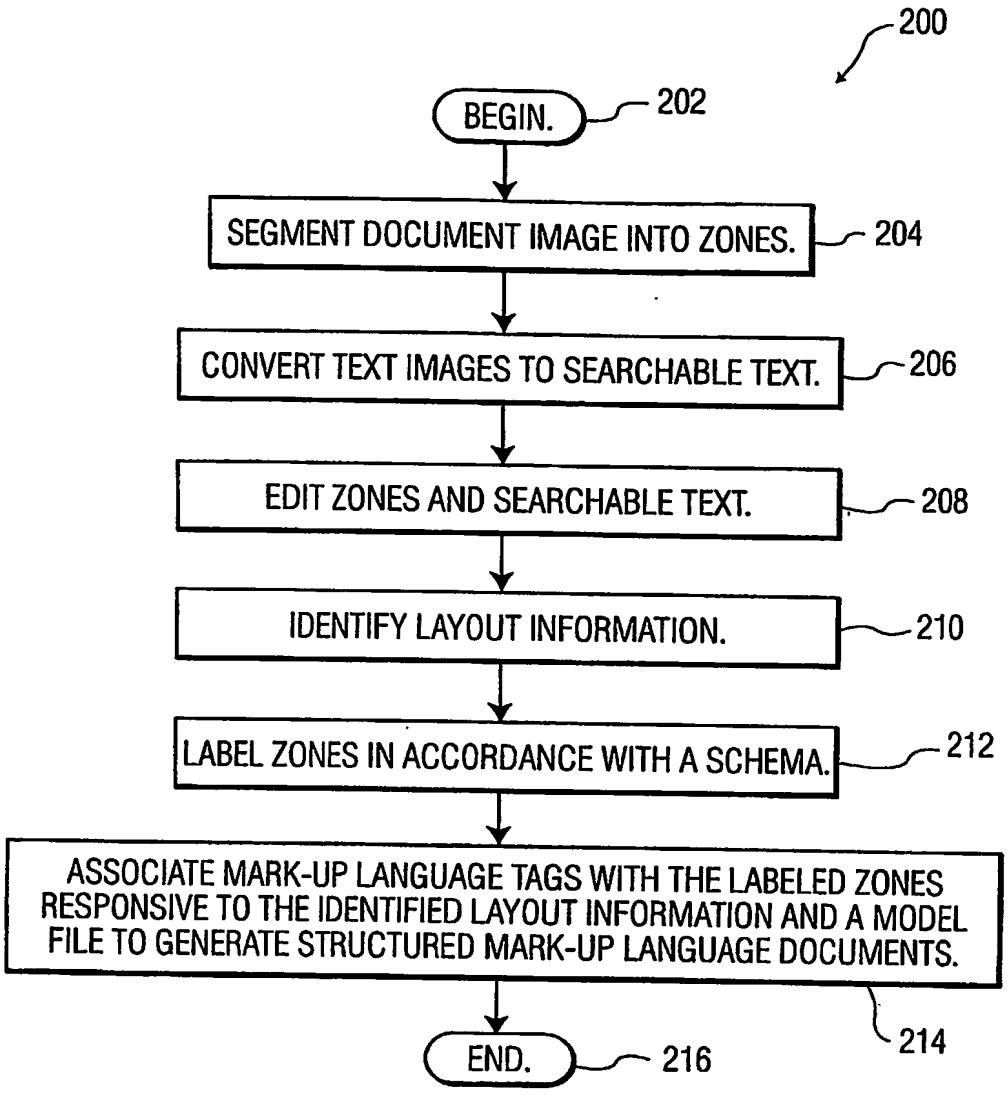
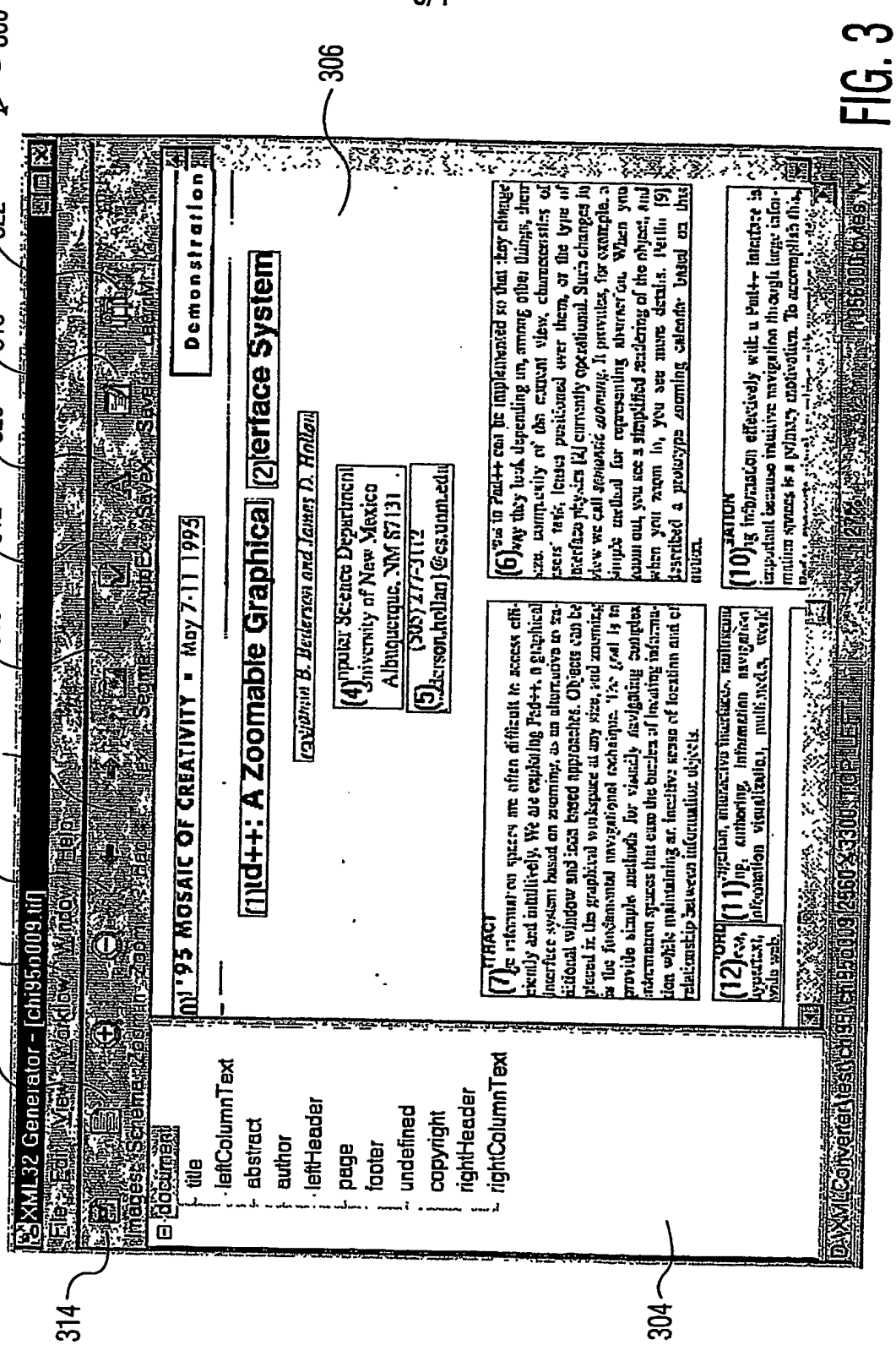

200
BEGIN.
202
SEGMENT DOCUMENT IMAGE INTO ZONES.
204
CONVERT TEXT IMAGES TO SEARCHABLE TEXT.
206
EDIT ZONES AND SEARCHABLE TEXT.
208
IDENTIFY LAYOUT INFORMATION.
210
LABEL ZONES IN ACCORDANCE WITH A SCHEMA.
212
ASSOCIATE MARK-UP LANGUAGE TAGS WITH THE LABELED ZONES RESPONSIVE TO THE IDENTIFIED LAYOUT INFORMATION AND A MODEL FILE TO GENERATE STRUCTURED MARK-UP LANGUAGE DOCUMENTS.
214
END.
216

FIG. 2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306
322
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320
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310
311
302
308
316
314
304
XML32 Generator - [chi95n009.tif]
File Edit View Window Help
Images Schema Zoom
Same Save SaveAs
Document
title
leftColumnText
abstract
author
leftHeader
page
footer
undefined
copyright
rightHeader
rightColumnText
'95 MOSAIC OF CREATIVITY • May 7-11 1995
Demonstration
[1]d++: A Zoomable Graphica
[2]erface System
Benjamin B. Bederson and James D. Hollan
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Bederson,hollan}@cs.unm.edu
[6]"s in Pad++ can be implemented so that they change
way they look depending on, among other things, their
ers' tasks. Icons positioned over them, or the type of
[7]TRACT
[10]ATION
[11]ng, authoring, information navigation
information visualizing, multimedia, world
[12]ORD
D:\XMLConverter\Test\chi95n009.tif 2560x3300x1 TIFF LE
FIG. 3

CHI '95 MOSAIC OF CREATIVITY • May 7-11 1995 Doctoral Consortium

High-End High School Communication: Strategies and Practices of Students in a Networked Environment

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ABSTRACT
This paper describes a study of the design of computer-based communication and media space environments that support highly interactive school-based learning communities. The two basic questions posed in this research are: (1) How are media space tools used by students in these classrooms, both in terms of the structure of communications activity and the surrounding physical and temporal constraints of the environment?; and (2) What are possible explanations for student behaviors and attitudes with regard to media space tools? The answers to these questions will provide insight for the design of next-generation media spaces for educational settings.

KEYWORDS: Media Spaces, Education, Communication, Design

INTRODUCTION
Classrooms are like islands, isolated from each other and the world beyond their boundaries. Students enter an enclosed space and for the next forty to ninety minutes, all interaction is confined to the individuals contained within the classroom walls. More often than not, the instructional strategies employed in classrooms also isolate students from one another. Communication is comprised of back-and-forth exchanges between teacher and student, and only rarely from student to student. This dissertation studies the deployment of highly-interactive computer-based communication tools designed to break the boundaries that exist in classrooms, with the goal of elaborating principles for the effective design and implementation of these environments in school settings.

The high school classrooms involved in this study have been augmented with a suite of highly interactive communication tools, including electronic mail, Usenet newsgroups, asynchronous multimedia notebooks, remote screen-sharing, and desktop video teleconferencing. In the CHI community, this combination of tools has come to be known as a *media space* [3, 1]. Media spaces enable individuals or groups to work together, even when they cannot be temporally or spatially co-located. This makes it possible for students to collaborate both with their distant peers and with experts outside the classroom. It is argued that classrooms equipped with media space technologies will become the norm over the next decade, thus making it important to understand student behaviors and attitudes with respect to the use of these communication technologies.

Two basic questions are asked in this research: (1) How are media space tools used by students in these classrooms, both in terms of the structure of communications activity and the surrounding physical and temporal constraints of the environment; and (2) What are possible explanations for student behaviors and attitudes with regard to media space tools? The answers to these questions are intended to provide guidance for the design of next-generation implementations of classrooms where highly interactive communication tools are used to link students as peer collaborators to professional communities, teachers, and other students both within and beyond the walls of the school.

BACKGROUND TO THIS WORK
At CHI '94 in Boston, a panel entitled "Media Spaces and Their Application in K-12 and College Learning Communities" [5] presented three different educational projects that employed varying configurations of media space technology to enhance learning environments. An important result of this panel was the recognition that the needs of school environments are significantly different than the white collar settings in which most media space research is conducted. Each of the three projects represented on the panel employed a different solution (both technological and pedagogical) to the problem of cross-classroom and beyond-school communication, but there was little empirical evidence to support any of the approaches presented.

In a search for past research to inform the question of media space application in classrooms, two distinct, but related, literatures were identified. The first body of research is comprised of studies describing the use of various communication tools in educational and work settings, primarily in terms of message flow over time [6]; studies of the classroom as a work environment enabled by

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FIG. 4